

## **PACKING FRAME STRUCTURE**

### **BACKGROUND AND SUMMARY OF THE INVENTION**

5           The present invention relates to a packing frame structure and, more particularly, to such a packing frame structure, which is practical for holding solid material elements stably in a row for delivery and storage to hook the carried solid material elements well protected against shocks or impact.

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          In order to protect solid material elements, for example, plate members against scratching and impact during delivery, packing materials and cartons/boxes are commonly used to pack solid material elements before delivery. It is expensive to pack solid material  
15 elements in this manner for delivery.

          The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a packing frame structure, which is practical for holding solid  
20 material elements stably in a row for delivery. It is another object of the present invention to provide a packing frame structure, which well protects the solid material elements held therein against shocks and scratching without the use of any packing materials. According to one aspect of the present invention, the packing frame structure comprises  
25 two top rails and two bottom rails adapted for fastening to material elements at four sides to hold material elements a row and to protect packed material elements against shocks and impact. According to another aspect of the present invention, two blocks are respectively fastened to the bottom rails at the bottom side to support the packing  
30 frame structure and the packed material elements above a flat surface

for enabling the package to be conveniently carried by a forklift. According to still another aspect of the present invention, a plurality of packing frame structures can be fastened to one another in a stack to hold multiple sets of material elements at different elevations.

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### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is an exploded view of a first embodiment of the present invention.

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Figure 2 is a perspective view of one bottom rail according to the first embodiment of the present invention.

Figure 3 is a perspective showing one application example of the first embodiment of the present invention.

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Figure 4 is a side view showing another application example of the first embodiment of the present invention where two detachable pallets are arranged in a stack.

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Figure 5 is a cross sectional view of Figure 3.

Figure 6 is a perspective exploded view of a second embodiment of the present invention.

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Figure 7 shows another application example of the second embodiment of the present invention.

Figure 8 shows still another application example of the second embodiment of the present invention.

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## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to Figures 1-3, a packing frame structure in accordance with the present invention is shown comprised of two top  
5 rails 1, two bottom rails 2, and two blocks 3.

The top rails 1 each comprise an elongated top wall 11, an elongated bottom wall 13, and an elongated vertical connecting wall 12 connected between one long side of the top wall 11 and one long side  
10 of the bottom wall 13. The bottom wall 13 comprises a plurality of locating holes 131 spaced along the length thereof in a line. The top wall 11 comprises a plurality of through holes 111 spaced along the length thereof in a line.

15 The bottom rails 2 each comprise an elongated top wall 21, an elongated bottom wall 23, and an elongated connecting sidewall 22 connected between one long side of the top wall 21 and one long side of the bottom wall 23. The top wall 21 comprises a plurality of locating holes 211 spaced along the length thereof in a line. The bottom wall 23  
20 comprises a plurality of through holes 231 spaced along the length thereof in a line.

The blocks 3 are narrow elongated members respectively attached to the bottom surfaces of the bottom walls 23 of the bottom  
25 rails 2 and fixedly fastened to the through holes 231 of the bottom walls 23 of the bottom rails 2 by fastening devices, for example, screws 30.

The locating holes 211 of the top walls 21 of the bottom rails 2  
30 are fastened to a respective locating hole 411 in the bottom flange 41 of

each of a number of planar material elements **4** by a respective fastening device, for example, a respective screw **51**, keeping the planar material elements **4** supported on the bottom rails **2** above the blocks **3** and vertically arranged in parallel. After connection of the  
**5** planar material elements **4** to the bottom rails **2**, the top rails **1** are respectively bilaterally attached to the planar material elements **4** at the top and arranged in parallel to the bottom rails **2**, and then fastening devices, for example, screws **52** are respectively mounted in the locating holes **131** of the bottom walls **13** of the top rails **1** and fastened  
**10** to a respective locating hole **421** in the top flange **42** of each planar material element **4** to fix the top rails **1** to the planar material elements **4**, keeping the planar material elements **4** well protected by the top rails **1** and the bottom rails **2**. When installed, a fork entry **6** is defined between the blocks **3** beneath the planar material elements **4** into which  
**15** the forks of a forklift truck can be inserted for lifting and moving the packed planar material elements **4**. A crane may be used to carry the packed planar material elements **4** to the desired place. When a crane is used, the hook of the hoisting block at the end of the hoisting rope of the crane can be hook in one through hole **111** of the top wall **11** of one  
**20** top rail **1**.

Referring to Figure 4, when a number of material elements **4** packed in a first packing frame structure, a second packing frame structure, after removal of the blocks **3** from the respective bottom rails  
**25** **2**, can be fastened to the first packing frame structure to hold another set of material elements **4** above the first packing frame structure. In this case, the through holes **231** of the bottom walls **23** of the second packing frame structure are selectively fastened to the through holes **111** of the top walls **11** of the top rails **1** of the first packing frame  
**30** structure. By means of this arrangement, multiple packing frame

structures can be fastened to one another to hold multiple sets of material elements 4 at different elevations.

Referring to Figures 1-3 again, each top rail 1 further  
5 comprises an elongated sidewall 14 perpendicularly downwardly  
extended along one long side of the respective bottom wall 13 in  
direction reversed to the respective elongated vertical connecting wall  
12. The sidewall 14 has a plurality of locating holes 141 longitudinally  
spaced in a line and adapted for fastening to a respective top locating  
10 hole 431 in one side flange 43 of each material element 4 by a  
respective fastening device, for example, a respective screw 53. Each  
bottom rail 2 further comprises an elongated sidewall 24  
perpendicularly upwardly extended along one long side of the  
respective top wall 21 in direction reversed to the respective elongated  
15 vertical connecting wall 22. The sidewall 24 has a plurality of locating  
holes 241 spaced in a line along the length thereof and adapted for  
fastening to a respective bottom locating hole 432 in one side flange 43  
of each material element 4 by a respective fastening device, for  
example, a respective screw 54. According to the application example  
20 shown in Figure 3, the locating holes 131; 141 of the bottom walls 13  
and sidewalls 14 of the top rails 1 as well as the locating holes 211;241  
of the top walls 21 and sidewalls 24 of the bottom rails 2 are fastened  
to the respective locating holes 411;421;431;432 of the material  
elements 4 by screws 51;52;53;54. According to the application  
25 example shown in Figure 8, only the locating holes 141 of the sidewalls  
14 of the top rails 1 and the locating holes 241 of the sidewalls 24 of  
the bottom rails 2 are fastened to the respective locating holes 431;432  
of the material elements 4 by screws 53;54. Figure 7 shows another  
application example of the present invention. According to this  
30 application example, the aforesaid blocks 3 are eliminated.

Figure 6 shows a packing frame structure according to a second embodiment of the present invention. According to this embodiment, the aforesaid sidewalls **14;24** are respectively eliminated from the top rails **1** and the bottom rails **2**. Further, the locating holes **131** of each top rail **1** as well as the locating holes **211** of each bottom rail **2** are not disposed at the same plane, that is, the bottom wall **13** of each top rail **1** comprises a plurality of downward lugs **130** spaced along the length and aligned in a line and defining a respective locating hole **131**; the top wall **21** of each bottom rail **2** comprises a plurality of upright lugs **210** spaced along the length and aligned in a line and defining a respective locating hole **211**. The downward lugs **130** are formed of a part of the bottom wall **13** of the respective top rail **1** by stamping. The upright lugs **210** are formed of a part of the top wall **21** of the respective bottom rail **2** by stamping. The locating holes **131** of the downward lugs **130** of the top rails **1** and the locating holes **211** of the upright lugs **210** of the bottom rails **2** can be fastened to respective locating holes **45;46** of flat material elements **4** by respective screws **55;56**.

Referring to Figure 5 again, spacer blocks **58** may be set in between each two adjacent material elements **4** and secured thereto by a screw bolt **57**. The material elements **4** each have a locating hole **47** for the mounting of the screw bolt **57**.